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Dated - 2 FEB 2001

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Patents Form 1/77

18 JAN 2000

The Patent Office

1/77

Request for grant of a patent

(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form)

The Patent Office
Cardiff Road
Newport
Gwent NP9 1RH

1. Your reference — IS/BP5828116 — **0001146.0**

2. Patent application number *(The Patent Office will fill in this part)* — 18 JAN 2000

19JAN00 E506274-2 D00060
P01/7700 0.00-0001146.0

3. Full name, address and postcode of the or of each applicant *(underline all surnames)*

CHESILVALE ELECTRONICS LIMITED
UNIT 3
MAESGLAS INDUSTRIAL ESTATE
NEWPORT
NP20 2NN
GB

Patents ADP number *(if you know it)* 06259830001

If the applicant is a corporate body, give the country/state of its incorporation — GB

4. Title of the invention — SIGNAL MONITORING

5. Name of your agent *(if you have one)* — MEWBURN ELLIS

"Address for service" in the United Kingdom to which all correspondence should be sent *(including the postcode)*

YORK HOUSE
23 KINGSWAY
LONDON
WC2B 6HP

Patents ADP number *(if you know it)* — 109006

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (if you know it) the or each application number

Country	Priority application number *(if you know it)*	Date of filing *(day / month / year)*

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application	Date of filing *(day / month /year)*

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? *(Answer 'Yes' if:*

a) any applicant named in part 3 is not an inventor, or
b) there is an inventor who is not named as an applicant, or
c) any named applicant is a corporate body.
See note (d))

YES

Patents Form 1/77

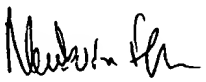
9. Enter the number of sheets for any of the following items you are filing with this form. Do not count copies of the same document

Continuation sheets of this form	0
Description	6
Claim(s)	0
Abstract	0
Drawing(s)	2

10. If you are also filing any of the following, state

Priority documents	0
Translations of priority documents	0
Statement of inventorship and right	0
Request for preliminary examination	0
Request for substantive examination *(Patents Form 10/77)*	0
Any other documents *(Please specify)*	0

11. I/We request the grant of a patent on the basis of this application.

Signature  Date 18 January 2000

12. Name and daytime telephone number of person to contact in the United Kingdom — IAN STUART — 0117 9266411

Warning

After an application for a patent has been filed, the Comptroller of the Patent Office will consider whether publication or communication of the invention should be prohibited or restricted under Section 22 of the Patents Act 1977. You will be informe it is necessary to prohibit or restrict your invention in this way. Furthermore, if you live in the United Kingdom, Section 23 of t Patents Act 1977 stops you from applying for a patent abroad without first getting written permission from the Patent Office unl an application has been filed at least 6 weeks beforehand in the United Kingdom for a patent for the same invention and either r direction prohibiting publication or communication has been given, or any such direction has been revoked.

Notes

a) *If you need help to fill in this form or you have any questions, please contact the Patent Office on 0645 500505.*

b) *Write your answers in capital letters using black ink or you may type them.*

c) *If there is not enough space for all the relevant details on any part of this form, please continue on a separate sheet of pap and write "see continuation sheet" in the relevant part(s). Any continuation sheet should be attached to this form.*

d) *If you have answered 'Yes' Patents Form 7/77 will need to be filed.*

e) *Once you have filled in the form you must remember to sign and date it.*

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SIGNAL MONITORING

The present invention concerns apparatus and methods for the monitoring of signals. It is particularly concerned with the monitoring of signals having both audio frequency and/or other analogue components, and components of a different character, e.g. out-of-band components, digital components and high voltage components. (These categories are not mutually exclusive). It is mainly concerned with signals transmitted over conductors, e.g. telephone lines.

An engineer typically monitors a line by connecting a test telephone and listening for an audio signal. If he hears nothing he may assume that there is no signal there. However a simple test telephone might not reveal the presence of signals other than audio signals. Thus the engineer might work on a line, unaware that he is disrupting non-audio signals such as digital traffic.

Telephone lines sometimes carry high voltages, e.g. for powering active circuits in a local distribution network. This can lead to damage to a test telephone, and possibly to injury to the engineer.

There are now some more sophisticated test telephones which can provide detection of some non-audio signals, particularly digital signals. For example,

Chesilvale Electronics Ltd produces a range of test telephones under the trademark DIGALERT.

Fig 1 is a schematic circuit diagram of the DIGALERT 360 test telephone. It has input terminals 1, 3 for connection to a line to be tested. The terminals 1, 3 are connected to telephone circuitry 5 via a switch 7. Normally the switch is open (the telephone is on-hook). The impedance of the switch 7 is then so great that the circuitry 5 is not exposed to voltages between the input terminals 1, 3. However, when the switch 7 is closed (the telephone is off-hook) the circuitry 5 is connected between the input terminals 1, 3. The telephone further includes a sensor 9 for detecting DC voltages between the input terminals 1, 3 above a first predetermined level. It also includes a sensor 11 for detecting that the DC voltage between the input terminals 1, 3 is below a second predetermined level. It further includes a digital signal detector 13 for detecting digital voltage signals between the terminals 1, 3. Upon the sensors 9, 11 detecting that the DC voltage is outside an acceptable range (i.e. there is an under-voltage or an over-voltage), or upon the digital signal detector 13 detecting that a digital signal is present between the input terminals 1, 3, a signal is transmitted to a microcontroller 15. The microcontroller 15 opens the

switch 7 if it is closed and in any case prevents its closure, so that the telephone circuitry is electrically disconnected from the input terminals 1, 3. The microprocessor 15 further triggers the generation of an alarm tone by a sound generator 17 (which may or may not be the same as a sound generator of the telephone circuitry 5).

We have now appreciated that the operation of monitoring a signal carrier can usefully employ a computer, particularly a personal computer ('PC') such as a Laptop or a palmtop.

Thus in one aspect the invention provides a system comprising:

(a) signal analysing circuitry having an input for receiving a signal from a carrier, said circuitry being operable to detect the presence of a predetermined type or types of signal or other traffic, e.g. a non-audio component (e.g. a digital signal, an out of band signal or a high voltage); and

(b) a PC coupled to the signal analysing circuitry to receive an output therefrom.

The signal analysing circuitry may be arranged to output a signal only when it does not detect a signal or component of a predetermined type. Its output may be the signal as received from the carrier or a modified version

thereof.

The signal analysing circuitry may be provided on an element such as a card that can be removably plugged into a port of the PC to effect said coupling. Alternatively it may be remote from the PC and coupled to it indirectly, e.g. via a radio link. Possible modes of coupling to the computer include USB, serial, PCMCIA, wireless, and via a cellular telephone system.

The system will usually include a loudspeaker or headset for rendering audible any audio component. This may be connected to the normal audio output coupling of the PC, or to an output coupling provided on the element bearing the signal analysing circuitry. Likewise there may be a microphone, so that the system can be used as a telephone for communicating over the carrier. This too may be provided on the PC or connected to the element, e.g. as part of a generally conventional handset.

In another aspect the invention provides a method of monitoring a signal on a carrier using a system as described above.

Some embodiments of the invention will now be described by way of example with reference to the accompanying drawings in which:

Fig 1 is a schematic circuit diagram of a known test telephone;

Fig 2 is a schematic diagram of an embodiment of the invention; and

Fig 3 is a schematic diagram of a second embodiment which employs a radio link.

Referring to Fig 2, this shows a laptop PC 100 having a card 102 plugged into a port. A pair of connectors 104 extend from the card 102. They terminate in clips 106 for connection to a pair of telephone wires.

Fig 2 shows two alternative ways of providing telephone functions. The card 102 may be coupled (or capable of being coupled) to a loudspeaker and microphone, e.g. provided by a telephone handset 108. The PC may be adapted to be coupled to a headset 110.

The card 102 may have circuitry corresponding to all or part of that shown within the box 120 in Fig 1, the terminals 1, 3 of Fig 1 corresponding to the connection 104 of Fig 2.

Of course, once the computer 100 is coupled to a telephone line, it can be used to carry out a variety of operations including performing tests on the line, analysing and/or displaying data received from the line, and transmitting and receiving data in various formats.

Fig 3 shows an alternative mode of coupling the analysing circuitry to the PC. In this case the circuitry is mounted in a box 200 fixed to a telegraph

pole 202. Leads 204 couple a telephone line to the circuitry. The output of the circuitry is transmitted from an aerial 206 as an RF signal. This is receivable by a receiving aerial 208 which may be mounted on a van 210 housing a PC 212.

In the illustrated examples, a computer is used to provide telephone-type functions. Of course it may provide other functions as well or instead. For example it may be set up to handle digital signals, in which case the signal processing circuitry would not block the outputting of digital signals. The circuitry may include a digital modem.

Fig. 1

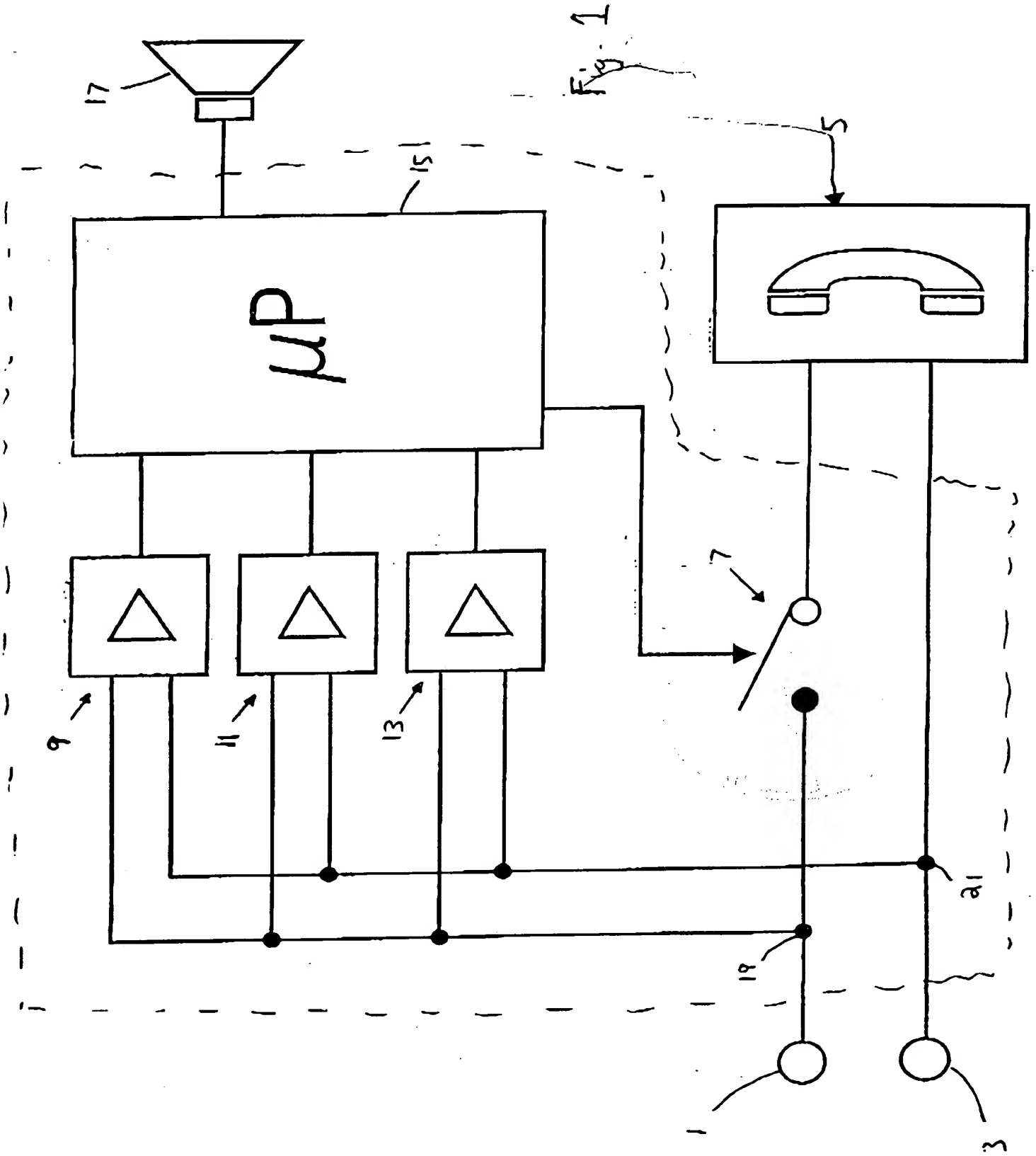
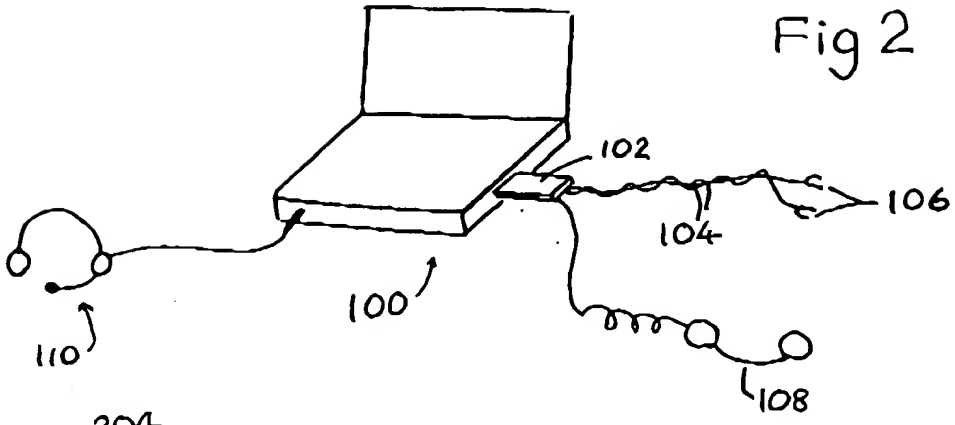


Fig 2



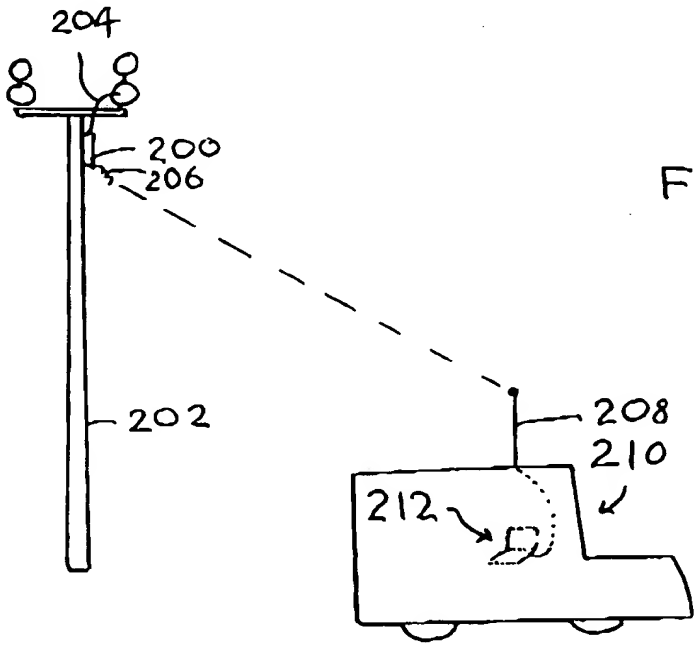


Fig 3